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FARMERS' BULLETIN No. 1734

MAKING AMERICAN CHEESE ON THE FARM

FOR HOME
CONSUMPTION



AERICAN CHEESE is a palatable and nutritious food. It furnishes abundant muscle- and body-building materials of the kind required by an active, vigorous life. The farm family especially could well afford to eat more cheese for its food value as well as for its appetizing flavor.

Cheese may be made at any time of the year, and making it does not require a great deal of time. Making small quantities of milk into cheese occasionally, or in seasons of the year when there is a surplus of milk on the farm, offers a desirable means of introducing variety into the diet of the farm family and also a means of conserving the milk for use later.

By following the directions given in this bulletin, cheese satisfactory for home use can be made on the farm with simple equipment that is usually available on the farm.

This bulletin supersedes Farmers' Bulletin 1191, Making American Cheese on the Farm.

MAKING AMERICAN CHEESE ON THE FARM FOR HOME CONSUMPTION

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INTRODUCTION

FOR making small quantities of American cheese on the farm for home consumption the factory method, or Cheddar process, is not recommended. The simpler and shorter method known as the stirred-curd or granular process, described in this bulletin, is more suitable on most farms. All equipment, with the exception of a thermometer, necessary for making cheese by this method is usually available on the farm.

The method described in this bulletin is being introduced and demonstrated in many communities by home demonstration agents and State dairy extension specialists.

EQUIPMENT AND SUPPLIES

The following equipment and supplies shown in figure 1 are required:

One floating dairy thermometer.	One tablespoon.
One large dish pan, tinned lard can, or wash boiler.	One teaspoon.
One knife with a long blade.	One cheese hoop and bandage.
One wire egg whip with cross wires.	One press.
One strainer.	Rennet extract or rennet tablets.
One 2-quart dipper.	Cheese color.
One teacup.	Salt.

A floating dairy thermometer, rennet extract or rennet tablets, and cheese color can be purchased from any dairy-supply house. Rennet and cheese color tablets can also be purchased at most drug stores, and for this reason are often used in farm cheesemaking. Butter color should not be used because it colors only the butterfat.



FIGURE 1.—Equipment and supplies needed in making cheese.

Ordinary table salt is suitable for salting cheese, but a high grade of coarse salt is preferable because it dissolves more slowly and more of it is absorbed by the curd.

A small cheese hoop can be made from an ordinary 1-gallon tin pail having straight sides by punching about a dozen small holes in the bottom with a 6-penny nail. A round wooden follower of slightly smaller diameter than the inside of the pail should be sawed out of dressed lumber. Only wood that is free from gummy, acid, or other objectionable substances should be used; otherwise the cheese will become tainted.

Figure 2 shows a press that can be easily made. It consists of a table or bench, a 2 by 4 or a 3 by 3 about $7\frac{1}{2}$ feet long, a pressing block, and a 30-pound weight.

KIND OF MILK TO USE

It is best to use whole milk for making American cheese on the farm. Milk from which butterfat has been removed or to which skim milk has been added will not only result in poorer quality cheese but in less cheese per hundred pounds of milk. The yield of cheese from 100 pounds ($11\frac{2}{3}$ gallons) of whole milk is approximately 12.5 pounds for milk that contains 5 percent butterfat, 10.6 pounds from 4-percent milk, and 8.3 pounds from 3-percent milk.

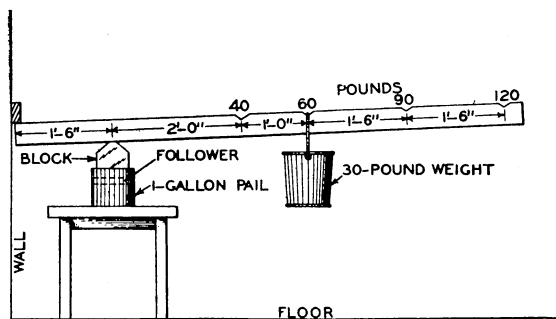


FIGURE 2.—A home-made cheese press.

CLEANLINESS OF THE MILK AND UTENSILS

In order to guard against dirty and off-flavored milk, the cows should be kept clean and the milking done in a place that is free from dust and objectionable odors. The milk should never come in contact with unclean utensils; therefore all utensils should be washed and scalded immediately after they are used, and when cheese is not made every day they should be washed and scalded again before being used.

Wear only clean clothing while making cheese; wash the hands well before starting, and keep them clean. Demonstrators should wear a clean white suit, and emphasize the necessity for cleanliness in handling the milk from the time of milking until the milk is made into cheese.

PREPARING THE MILK

A certain amount of lactic acid in the milk is desirable. In commercial plants a pure culture of a lactic-acid-producing organism, or starter, is added to the milk to bring about the production of the desired acidity. However, in making cheese at home it is not usually practicable to maintain a lactic-acid-producing culture. In order to attain to some degree the acidity that would be developed with

the aid of a starter at the end of the making process, fresh milk should be cooled to about 60° F. and held 3 to 4 hours before cheesemaking is started. When the night's milk can be cooled to 60° and maintained at that temperature until the following morning, it can be mixed with the morning's milk and the cheesemaking process started at once. When only milk that has stood over night is used, it may contain too much acid unless it has been cooled properly; and the cheese is apt to have a pasty or mealy body and an acid flavor.



FIGURE 3.—Heating the milk.

On the other hand, if only fresh morning's milk is used, the cheese may have a weak body and may not develop the flavor characteristic of American cheese.

When the necessary preparations for making the cheese have been completed, the morning's milk is mixed with the night's milk in the container in which the curd is to be made. Then the milk is heated to 86° F., as shown in figure 3, by setting the container on a stove. If the heating is done on a wood or coal stove, the grate in the oven

should be placed on top of the stove, so that the milk container will not come in direct contact with the hot metal. A gas stove or an oil stove can also be used. The milk should be stirred slowly while it is being heated. When a temperature of 86° has been attained, remove the container from the stove or place it on the back part of the stove so that the temperature will not continue to rise.

ADDING THE CHEESE COLOR

At this point a coloring agent may be added to the milk. Cheese made during the winter months without the addition of coloring matter is practically white. When it is made in the summer months it has a light straw color. If a deeper shade of yellow is desired, cheese color should be used. From one-half to one teaspoonful of coloring agent for each 100 pounds of milk should be diluted in a teacupful of water, and then stirred into the milk until it has been evenly distributed. If color tablets are used, follow the directions given on the box.

ADDING THE RENNET

Now, with the milk at 86° F., add enough rennet to coagulate the milk into a firm jellylike curd in about 30 minutes. When rennet extract is used, usually from 2 to 4 teaspoonfuls will be required for each 100 pounds of milk. Dilute the extract in a pint of cold water and mix the solution thoroughly with the milk, as shown in figure 4. If rennet tablets are used, the directions on the container should be followed. After the rennet has been added and thoroughly stirred in, allowing about 3 minutes for mixing, the milk must remain undisturbed until after it has coagulated; otherwise the curd will be broken and grainy, and whey will separate from the curd before the curd is ready to be cut. The container should be covered during this period to retard the cooling of the surface of the milk.

CUTTING THE CURD

When the curd becomes firm and jellylike, cut it into cubes about three-eighths of an inch square. A method often used to determine the desired condition for cutting is to press on the curd near the edge of the container with the back of the hand, as shown in figure 5. If the curd breaks away cleanly from the side of the container it is ready to be cut. Another method is to insert the forefinger obliquely into the curd, then split the curd with the thumb, and raise the finger slowly, as demonstrated in figure 6. If the curd is ready to be cut, the curd over the finger will split cleanly, and clear whey will fill the opening.

With a clean knife that is long enough to reach from the surface of the curd to the bottom of the container, the curd may be sliced crosswise into strips three-eighths of an inch wide and then lengthwise in the same manner (fig. 7), so that oblong pieces three-eighths of an inch square are formed. The curd should then be carefully stirred for about 2 minutes with a wire egg whip, which has cross wires, or until it has been cut as uniformly as possible into cubes about three-eighths of an inch square (fig. 8). The curd should then be stirred with a large spoon or paddle to prevent further cutting

or breaking of the curd. In about 15 minutes, or when sufficient whey has been expelled from the curd to separate the cubes of curd, it is time to begin heating.

HEATING THE CURD

The heating may be done by setting the container back on the stove. The temperature of the curd and whey should be raised slowly; about 2° every 5 minutes until a temperature of from 100° to 106° F. is



FIGURE 4.—Adding color and rennet.

reached. The curd should be kept in motion with a spoon or other suitable stirrer throughout the heating period to prevent the cubes of curd from sticking together and forming lumps. Lumps will contain more whey than the smaller pieces of curd, and may result in light-colored spots in the finished cheese. The temperature of the curd and whey is raised to from 100° to 106° in from 30 to 40 minutes. At the end of this period the curd is much firmer, and will require less stirring to prevent lumps during the rest of the time that it remains in the whey. The final heating temperature



FIGURE 5.—Testing the curd by pressing with the back of the hand.



FIGURE 6.—Testing the curd with the forefinger and thumb.

should be maintained until the curd has attained the desired degree of firmness.

At this time a handful of curd gently squeezed and suddenly released should easily break apart and show very little tendency to stick together. From $1\frac{1}{2}$ to $2\frac{1}{2}$ hours after the addition of the rennet the curd should have this characteristic. In appearance it should be similar to that in the strainer in figure 9.

The whey can then be removed. This is the most critical stage in the whole process. If the curd is not firm when the whey is removed, the cheese may have a weak pasty body, may develop sour



FIGURE 7.—Cutting the curd.

or undesirable flavors in a short time, may not hold its shape, and will make cheese of inferior quality. On the other hand if the curd is too firm the cheese will be dry and corky.

REMOVING THE WHEY

The most convenient and quickest method of removing the whey is to dip off most of it (fig. 10) after the curd has settled to the bottom of the container. Then the remainder of the whey and the curd can be dipped or poured on a rack covered with cheesecloth and placed over a dishpan (fig. 11) or other receptacle for the whey.

The curd can then be put back in the container. The container should be tilted (fig. 12) to allow any whey remaining in the curd

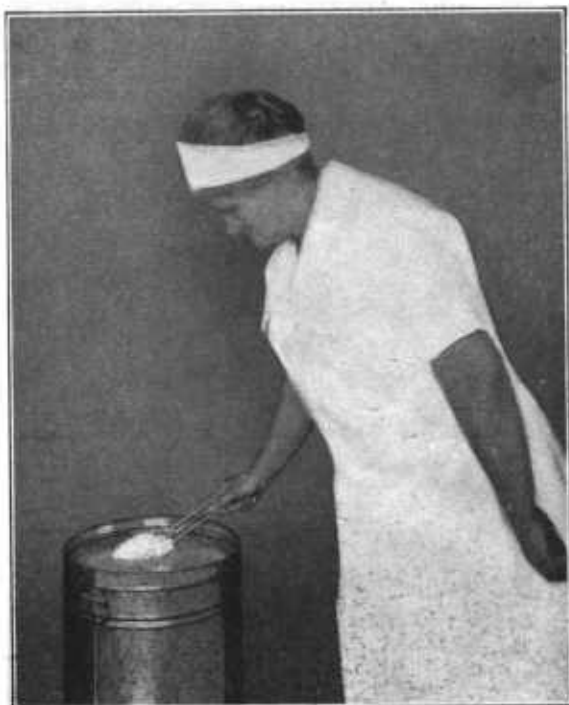


FIGURE 8.—Stirring the curd with a wire egg whip to form cubes.

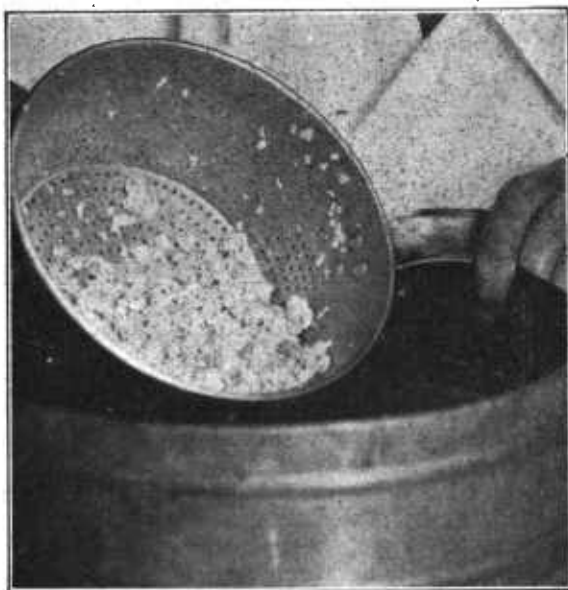


FIGURE 9.—Appearances of curd when ready for the removal of the whey.

to drain away from the curd. The curd should be stirred and kept free from lumps. When the curd has cooled to 90° F., and has a slight acid development which is indicated by a rubbery texture and causes a squeaky sound when chewed, it is ready to salt.

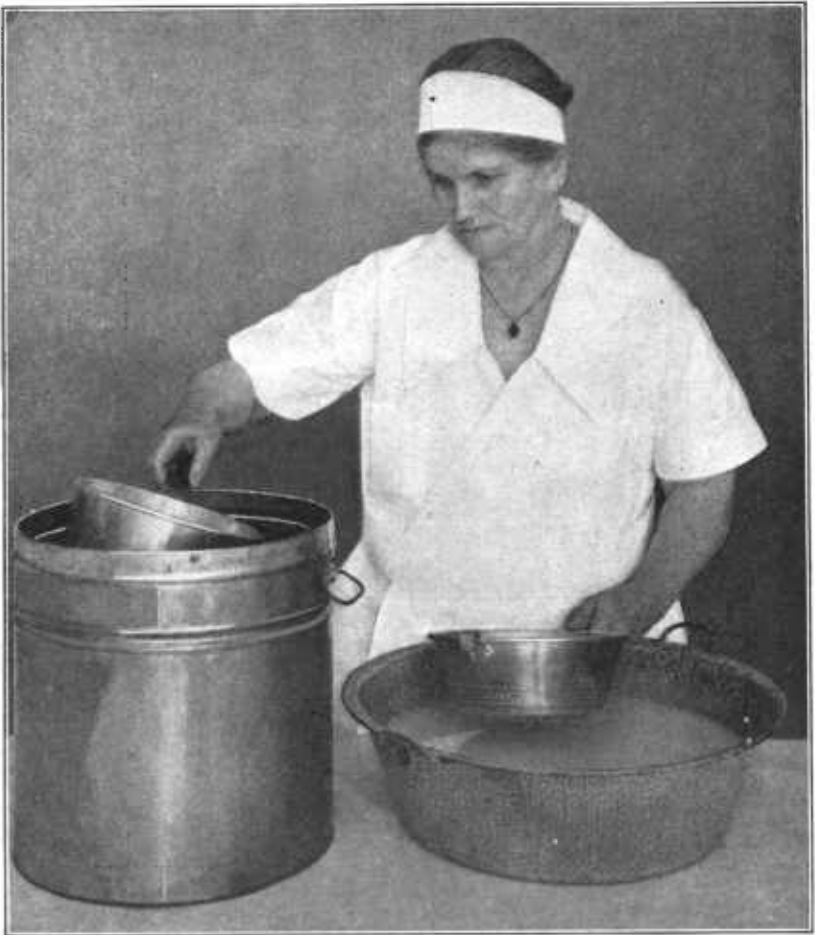


FIGURE 10.—Dipping off whey.

SALTING THE CURD

The curd should be salted at the rate of $7\frac{1}{2}$ tablespoonfuls per 100 pounds of milk used. The salt should be distributed evenly and mixed thoroughly with the curd, as shown in figure 12. As soon as the salt has dissolved and the curd has cooled to about 85° F. with stirring, it is ready to be placed in the cheese hoop. If the curd is put in the hoop at too high a temperature an excessive amount of fat will be lost. The higher temperature also favors undesirable fermentation.

HOOPING AND PRESSING THE CURD

In making small prints of cheese that weigh from 5 to 10 pounds, the cheese hoop need not be lined with a bandage when the curd is first placed in it. A circle of medium-weight, unbleached, cotton cloth, known as a cap cloth, of the same diameter as the hoop should be placed in the bottom of the hoop. Then the curd is placed in the hoop and a similar cap cloth laid on top of the curd. A wooden follower of the same diameter as the inside of the hoop is then placed on the curd, and the cheese is put in the press.



FIGURE 11.—Removing the rest of the whey.

About 40 to 60 pounds pressure should be applied by adjusting the weight on the lever shown in figure 2. After 5 or 10 minutes increase the pressure to 90 or 120 pounds, depending on whether a 5-pound or 10-pound cheese is being pressed. A large cheese requires more pressure than a small one. After the cheese has been under pressure from 30 to 60 minutes it is ready to be dressed.

DRESSING THE CHEESE

Release the pressure and turn the hoop bottom side up on a table so the cheese can drop out. Remove the cap cloths and dip the cheese in a pail of warm water (at 100° F.) to remove any fat adhering to the surface. At this time a bandage of lightweight,

unbleached, cotton cloth (see cover) which is wide enough to lap over the edge about 1 inch, should be wrapped tightly around the cheese (fig. 13). The cap cloths should then be replaced (fig. 14) and the cheese put back in the hoop (fig. 15) and pressed for 16 to 24 hours under a pressure of from 100 to 120 pounds (fig. 16).

REMOVING THE CHEESE FROM THE PRESS

At the end of the pressing period, the cheese should have a surface that is smooth and free from cracks or openings (fig. 17). If there are any openings or cracks the bandage should be removed, the cheese dipped in warm water to soften the rind, then rebandaged and put back in the press. A cheese should never be put on the shelf



FIGURE 12.—Salting the curd.

until it has a sound rind. Openings on the surface of cheese make excellent places for molds to grow. Mold on the surface will not cause serious trouble if there are no openings through which it can enter the cheese. When the cheese is taken from the press and its surface is smooth and free from openings it should be wiped off with a clean, dry cloth, and placed in the curing room.

THE CURING ROOM

The most suitable place for curing cheese on the farm is usually in the basement of the house or in the spring house. A temperature of from 50° to 60° F. is most desirable but is very seldom available on most farms during the summer months. The cheese

should be cured in the coolest available place that can be kept clean and free from molds. The windows should be opened at night to allow cool air to enter and closed in the daytime to keep out the warm air.

The doors and windows should be screened and covered with cheesecloth to keep out the cheese fly, which is much smaller than the house fly. The house fly will do no particular damage to the cheese. If the cheese fly is allowed access to the curing room, it will cause the curing room to be infested with cheese mites or "skippers" and may cause a total loss of some of the cheese. If



FIGURE 13.—Wrapping the bandage around the cheese.

the room and shelves are kept clean and free from grease and the cheese has a sound rind that is free from openings, the cheese fly will not have a desirable place to lay its eggs.

CARE OF THE CHEESE WHILE CURING

The care of American cheese from the time it leaves the press until it is cured or ready for consumption is very important.

If a basement or spring house is used for curing the cheese, the humidity may be high enough so that all the bandages can be taken off before the cheese is placed on the shelves to dry. If a room with a low humidity is used, the bandages should be left on until the cheese is paraffined. When the room is too dry and the bandages

are not left on, the cheese will dry so fast that the rind will crack and make it possible for molds and flies to enter the cheese. If the room is too moist, mold growth may be expected.

As soon as the surface of the cheese feels dry, it is in proper condition to be paraffined. A period of from 3 to 6 days in the drying room is usually sufficient, depending on the size of the cheese and the humidity and temperature of the curing room. If the cheese does not form a dry rind in about 6 days, it should be transferred to a drier room.

During the period in which the cheese is drying and the rind forming, the cheese should be turned and wiped off daily with a



FIGURE 14.—Replacing the cap cloths.

clean, dry cloth. After paraffining it is only necessary to turn the cheese often enough to keep it clean and free from mold. The cheese shelves should be washed once a week and placed in the sun to dry thoroughly. This treatment will kill most mold spores that may be present.

If the cheese is properly made and is properly cared for in the curing room, it will have a firm body and a mild flavor when about 6 weeks old. If a low temperature (below 50° to 60° F.) is provided for curing the cheese, it will cure more slowly, and if a sharp flavor is not objectionable this type of cheese may be held for from 3 to 5 months or longer.

PARAFFINING THE CHEESE

Cheese is paraffined to prevent it from drying too much and also to prevent mold growth. If the surface of the cheese is not dry enough the paraffin will not adhere to it. The paraffin should be heated to between 210° and 220° F. in a receptacle of suitable size into which the cheese can be dipped and held for about 10 seconds. If the paraffin is not hot enough when the cheese is immersed in it, the coat of paraffin will be so thick that it will scale off.

A simple method of dipping the cheese in the paraffin is to immerse one-half or more of the cheese, and then, after allowing a min-



FIGURE 15.—Replacing the hoop on the dressed cheese.

ute or two for the paraffined half to dry, immerse the other half. A 5- or 10-pound cheese can be dipped in this way by holding it in the hand, and the cheese will be completely covered with paraffin.

SAVING THE WHEY

One hundred pounds of whey is worth approximately one-fourth as much as a bushel of corn for hog feeding. In other words, if a bushel of corn is worth 40 cents, then 100 pounds of whey is worth 10 cents. Whey can also be fed to chickens. Its high sugar content makes it valuable in preventing and curing coccidiosis in chickens as well as in stimulating growth.

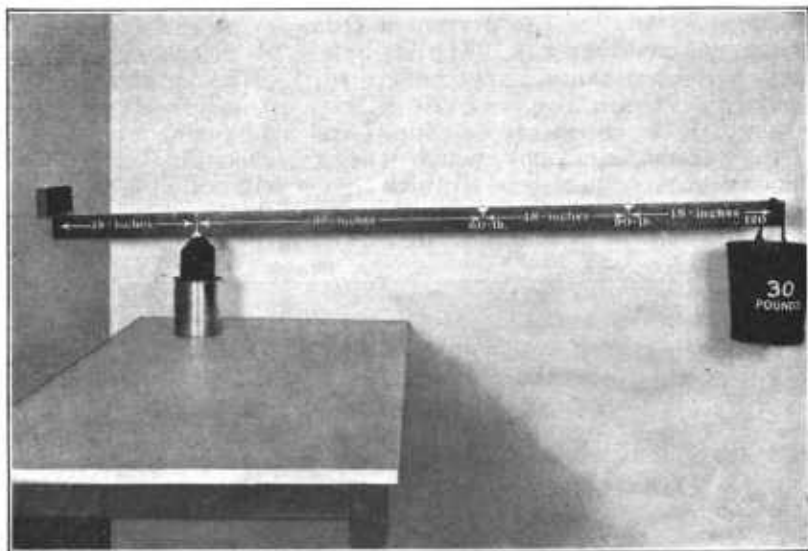


FIGURE 16.—The dressed cheese is pressed for 16 to 24 hours.



FIGURE 17.—The cheese ready for the curing room.

SUMMARY OF POINTS IN PROCEDURE

Use clean, sweet milk for cheesemaking.

Heat milk to 86° F. Use a thermometer to determine the temperature.

Add cheese color if desired, using one-half to 1 teaspoonful to 100 pounds of milk. Do not use butter color.

Add rennet, first diluting it with a pint of cold water. Use 2 to 4 teaspoonfuls to 100 pounds of milk. Stir rennet in thoroughly, then leave milk undisturbed until after it has coagulated, which may take 30 to 35 minutes. Rennet tablets may be used.

Cut the curd when sufficiently firm. Do not crush or break it.

Stir the curd gently for 15 or 20 minutes.

Heat at the rate of 2° in 5 minutes until the temperature reaches 100° to 106° F. Stir while heating.

Allow curd to remain in whey at 100° F. until firm and until enough acid has developed. Do not let curd mat together.

The whey can be removed when the curd is firm enough so that a handful of it pressed together between the hands falls apart readily when the pressure is released.

When the curd has cooled to 90° F. and has a slight acid development indicated by a rubbery texture and a squeaky sound when chewed, add salt at the rate of 7½ tablespoonfuls for 100 pounds of milk.

Have the curd at a temperature of about 85° F.; put it into a hoop, and apply pressure gently.

Dress the cheese, return it to the press, and apply full pressure for 16 to 24 hours.

Place the cheese in a curing room in the coolest available place; a temperature of between 50° and 60° F. is the most desirable.

While the cheese is curing turn it daily until a dry rind forms, then often enough to prevent mold. Paraffin cheese as soon as the surface is dry, which should be within 3 to 6 days, by dipping it in paraffin heated to a temperature of from 210° to 220° F.

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